CLAIMS

1. Plate-shaped heat exchanger (20, 120) for a heat exchange unit (40) of a chemical reactor (60), having a substantially box-like flattened structure (22), with a substantially parallelepiped, rectangular configuration, defining an internal chamber (24), and comprising an inlet connection (28) and an outlet connection (29) for a heat exchange operating fluid into and from said chamber (24), and a distributor pipe (10, 110) of said operating fluid in said chamber (24), extended in said structure (22) at a long side (22a) of it, characterised in that said distributor pipe (10, 110) comprises a first tube (30, 130) and second tube (32, 132), positioned one inside the other, between said tubes, respectively external tube (30, 130) and internal tube (32, 132), an interspace (30a) being defined in fluid communication, on one side, with said chamber (24) through a plurality of openings (26) provided in the external tube (30, 130) of said distributor pipe (10, 110), and, on the other side, with the internal tube (32, 132) of the same distributor pipe (10, 110), said internal tube (32, 132) being hydraulically connected to said inlet connection (28) for the heat exchange operating fluid.

2. Plate-shaped heat exchanger (20, 120) according to claim 1, characterised in that the interspace (30a)

communicates with the internal tube (32, 132) of the distributor pipe (10, 110) through a plurality of further openings (34) provided in it.

3. Plate-shaped heat exchanger (20, 120) according to claim 2, characterised in that said further openings (34) provided on the internal tube (32, 132) are circular.

4. Plate-shaped heat exchanger (20, 120) according to claim 3, characterised in that the diameter of the further openings (34) varies along the length of the internal tube (32, 132).

5. Plate-shaped heat exchanger (20, 120) according to claim 2, characterised in that said openings (26) and said further openings (34) are distributed along all the length of the respective external (30, 130) and internal tubes (32, 132).

6. Plate-shaped heat exchanger (20, 120) according to claim 1, characterised in that said external tube (30,130) and said internal tube (32, 132) are substantially rectilinear.

7. Plate-shaped heat exchanger (20, 120) according to claim 1, characterised in that said internal tube (32, 132) has a substantially oval section.

8. Plate-shaped heat exchanger (20, 120) according to

claim 1, characterised in that said external tube (30, 130) has a substantially spindle-shaped section.

9. Plate-shaped heat exchanger (20, 120) according to claim 1, characterised in that said internal tube (32, 132) has circular section.

10. Plate-shaped heat exchanger (20, 120) according to claim 1, characterised in that it is equipped with a collector pipe (11) for the operating fluid, extended at the other long side (22b) of said structure (22) and comprising a first (31) and a second tube (33), positioned one inside the other, between said tubes, respectively external (31) and internal (33), an interspace being defined in fluid communication, on one side, with said chamber 24 though a plurality of openings (27) provided in the external tube (31) of said collector pipe (11) and, on the other side, with the internal tube (33) of the same collector pipe (11), said internal tube (33) being hydraulically connected to said heat exchange operating fluid outlet connection (29).

11. Method for carrying out a plate-shaped heat exchanger (20, 120) according to claim 1, characterised in that said internal tube (32, 132) and said external tube (30, 130), substantially positioned co-axially, are reciprocally constrained in the cross-wise direction to the axis.

12. Method according to claim 11, characterised in that said internal tube (132) is made starting from a circular tube, equipped with finning (138), said finning (138) being removed, at least partially, at two opposite sides.

13. Method according to claim 12, characterised in that said finning removal is performed by a milling step to create two opposite and parallel flat faces (132a, 132b).

14. Method according to claim 13, characterised in that said internal tube (132) is inserted inside the external tube (130), with the two flat faces (132a, 132b) positioned substantially parallel to the direction of the wider dimension of the spindle of the external tube (130), said internal tube (132) then being rotated at an angle of about 90°, until opposite sides (132c, 132d) of the internal tube (132) that are still completely finned, are blocked against internal walls of the external tube (30).

15. Plate-shaped heat exchanger (20) carried out according to the method of claim 11, characterised in that the cross-wise tie is constituted by opposite ridges (36) of the internal surface of the external tube (30).

16. Plate-shaped heat exchanger (20) according to claim 15, characterised in that the said ridges (36) are four in number, all positioned at the same height of the external tube (30).

17. Plate-shaped heat exchanger (20) according to claim 16, characterised in that said set of four ridges (36) are repeated at different heights of the external tube (30).

18. Plate-shaped heat exchanger (20) according to claim 15, characterised in that said ridges (36) are arranged at different heights of the external tube (30), appropriately staggered in a substantially helicoidal arrangement.

19. Plate-shaped heat exchanger (120) carried out according to the method of claim 12, characterised in that the cross-wise tie is constituted by a restrained joint.

20. Heat exchange unit (40) of a chemical reactor (60), characterised in that it comprises a plurality of plate-shaped heat exchangers (20, 120) according to claim 1.

21. Chemical reactor (60) of the type comprising a cylindrical shell (62) closed at the opposite ends with respective bottoms, lower (63) and upper (64), inside the shell (62) a reaction environment (69) being provided, comprising a catalytic bed (50) wherein a heat exchange unit (40) is positioned, characterised in that said heat exchange unit (40) comprises a plurality of plate-shaped heat exchangers (20, 120) according to claim 1.

22. Chemical reactor (60) according to claim 22, characterised in that said heat exchange unit (40) has a substantially cylindrical configuration and comprises a

plurality of said plate-shaped heat exchangers (20, 120), placed side by side next to each other in a radial arrangement.